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Self-Reported Postwar Injuries Among Gulf War Veterans

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S Y N O P S I S

Objective. From September 1995 to May 1996, the authors conducted a telephone survey of Iowa military personnel who had served in the regular military or activated National Guard or Reserve during the Gulf War period. To assess the association between military service in a combat zone and subsequent traumatic injury requiring medical consultation, the authors analyzed veterans' interview responses.

Methods. Using data from the larger survey, the authors compared rates of self-reported postwar injuries requiring medical consultation in a sample of Iowa Gulf War veterans to the rates in a sample of Iowa military personnel who served at the same time, but not in the Persian Gulf.

Results. Of 3695 veterans, 605 (16%) reported a traumatic injury in the previous three months requiring medical consultation. Self-reported injuries were associated with service in the Persian Gulf (odds ratio 1.26; 95% confidence interval 1.02, 1.55).

Conclusion. This finding is consistent with the results of earlier studies of traumatic injury mortality rates among war veterans.

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Several studies have documented elevated injury mortality rates among Vietnam veterans, especially associated with motor vehicle crashes.¹⁻³ Two recent studies raise analogous issues with regard to Gulf War veterans. Kang and Bullman found a small excess in postwar mortality among Gulf War veterans compared with non-Gulf War military personnel serving at the same time; the excess was almost entirely due to deaths from traumatic injury, and most of the fatalities were attributable to motor vehicle crashes.⁴ In contrast, a study of the postwar hospitalization experience of Gulf War veterans compared with that of other veterans of the same era who had not served in the Gulf War failed to find a statistically significant difference in hospitalizations due to injuries and poisonings.⁵

IOWA PERSIAN GULF STUDY

This article reports the results of an analysis of data from a larger study, the Iowa Persian Gulf Study.⁶⁻⁹ Designed to assess the prevalence of self-reported symptoms and illnesses among Iowa military personnel deployed during the Gulf War, the Iowa Persian Gulf Study was a cross-sectional, population-based telephone interview survey of 4886 Iowa veterans. Military personnel were eligible for inclusion in the study if they listed Iowa as the home of record on their initial military record and if they served in the regular military or activated National Guard or Reserves at any point from August 2, 1990, through July 31, 1991—the Gulf War (GW) period. Using the Department of Defense's Defense Manpower Data Center in Monterey, California, we were able to identify 28,968 eligible veterans, who formed the target population.

Based on data from the Defense Manpower Data Center, we classified each subject into one of four study categories: GW regular military, GW National Guard/Reserve, non-GW regular military, and non-GW National Guard/Reserve. We classified anyone who served in the GW theater during the GW period as belonging to the GW cohort. Within each category, we stratified by the following demographic variables: age (≤ 25 or > 25 years on August 2, 1990), sex, "race" (white or black/other), rank (officer or enlisted), and branch of service (Army, Navy/Coast Guard, Air Force, or Marines). We chose 25 years as the age cut-off to generate two roughly equal categories. For "race," we combined "black" and "other" because of small numbers. We distinguished officers from enlisted personnel because of their different functions in the military.

As described elsewhere,⁶ we designed the sample as a

stratified random sample with proportional allocation. Sample selection proceeded in two stages. First, we randomly selected approximately 750 subjects in each category. After interviewing approximately 1600 subjects, we estimated based on response rates how many additional subjects would be needed to attain the goal of 750 subjects interviewed in each category; we then selected a supplementary sample. The final sample consisted of 4886 veterans proportionately distributed across the demographic categories. In all analyses, including those reported here, we treated the two stages of the sample as a single sample.

Trained interviewers carried out telephone interviews from September 1995 to May 1996 using computer-assisted telephoning interview software. Up to 20 attempts were made to reach each potential subject. Of the 4886 veterans in the sample, 3695 completed telephone interviews—that is, 76% of the eligible subjects and 91% of those who were reached by the interviewers. Of the eligible Gulf War veterans, 78% participated, compared with only 73% of the non-Gulf War control subjects. Of the 3695 veterans, 1896 were Gulf War veterans and 1799 were non-Gulf War control subjects.

We compared self-reported injuries of Gulf War veterans to those of military personnel who served at the same time but did not serve in the Persian Gulf. To minimize recall bias, we used a three-month time frame on the injury questions.

The interview protocol included three injury questions: first, interviewers asked: "How many different times in the past three months were you injured seriously enough to seek medical advice or cut down on your usual activities for more than half a day." If the answer to the first question was yes, the interviewer also asked, "Did you visit or call a health care professional because of any kind of injury or accident in the past three months?" and "During the past three months did you have any kind of injury that caused you to cut down on the things you usually do for more than half a day?"

Of the 3695 veterans who completed interviews, 23% reported having had an injury within the previous three months that required either medical consultation or a restriction in daily activities (in answer to the first question); 15% reported having had an injury within the previous three months that required medical attention (in answer to the second question).

When we looked at all self-reported injuries that required either medical consultation or a restriction of normal activities, we found no association with Gulf War exposure, either overall or in any of the demographic cat-

egories.⁶ For the analyses reported here, we focused on self-reports of injuries requiring medical attention. On the assumption that these were the more severe injuries, we looked at injury rates among the 16% of veterans who answered yes to the second question above.

METHODS

To answer the question of whether there was a difference in injury rates between those deployed to the Persian Gulf (exposed) and those not deployed (controls) among those reporting injuries requiring medical attention, we first calculated stratum-specific cumulative incidence rates and, for each stratum, compared the unadjusted rates of the exposed and unexposed using odds ratios and 95% confi-

dence intervals. Next, we compared the cumulative injury rates of the exposed and unexposed while controlling for the other demographic variables using logistic regression analyses. To take account of the complex structure of the sample, we used SUDAAN software¹⁰ to generated weighted rates and standard errors.

RESULTS

Focusing on injuries that, according to respondents, required medical consultation, we found an association with service in the Persian Gulf (odds ratio [OR] = 1.26, 95% CI 1.02, 1.55). As shown in Table 1, this association was strongest in several strata: respondents 25 years old or younger (OR = 1.33); males (OR = 1.30); enlisted sol-

Table. Estimated three-month cumulative incidence rates of self-reported injuries requiring visits or calls to medical professionals, by exposure to Persian Gulf War and by demographic variables, and stratum-specific odds ratios, Iowa Persian Gulf War Study

Variable	Estimated three-month cumulative incidence rates							
	Exposed to Gulf War		Control subjects		Unadjusted OR	95% CI	Adjusted OR ^a	95% CI
	Number	Weighted percent	Number	Weighted percent				
Age in years as of August 2, 1990								
≤25	1050	19.7	845	15.5	1.33	1.01, 1.75	1.33	1.00, 1.76
>25	846	14.9	954	13.4	1.13	0.83, 1.53	1.14	0.83, 1.57
Sex								
Female	129	11.8	206	13.8	0.84	0.38, 1.84	0.62	0.27, 1.44
Male	1767	18.1	1593	14.6	1.29	1.04, 1.59	1.30	1.04, 1.61
Racial category								
White	1824	17.8	1719	14.8	1.25	1.02, 1.53	1.23	0.99, 1.52
Other	72	16.5	80	6.3	2.95	1.08, 8.06	2.68	0.93, 7.77
Rank								
Enlisted	1727	18.2	1571	14.6	1.30	1.05, 1.61	1.30	1.04, 1.62
Officer	169	12.2	228	13.9	0.86	0.45, 1.63	0.80	0.40, 1.60
Branch of service								
Army	1140	19.4	943	14.3	1.44	1.07, 1.94	1.42	1.06, 1.90
Air Force	131	13.2	401	17.0	0.74	0.42, 1.31	0.70	0.40, 1.26
Marines	353	17.0	150	15.3	1.14	0.64, 2.02	1.10	0.61, 1.97
Navy/Coast Guard	272	16.5	305	11.9	1.47	0.90, 2.40	1.41	0.85, 2.33
Military status								
Regular military	985	17.9	968	14.3	1.30	1.03, 1.64	1.29	1.01, 1.65
National Guard or Reserve	911	17.2	831	16.1	1.08	0.90, 1.30	1.07	0.88, 1.30

^aAdjusted by all stratified variables except itself. For example, the OR for respondents ≤ 25 years of age was adjusted by sex, racial category, rank, branch, and military status.

OR = odds ratio

CI = confidence interval

diers (OR = 1.30); those in the Army (OR = 1.42); and those in the regular military (OR = 1.29).

DISCUSSION

We found a small, but statistically significant association between Gulf War service and self-reports of injuries requiring medical consultation. These results are consistent with findings of elevated fatal traumatic injury rates in other studies of war veterans, although, unlike the present analysis, these studies focused on fatal injuries.¹⁻⁴

The reasons for the higher rate of traumatic injury among war veterans are not well understood. However, in our earlier analysis of data from this cohort, we found that service in the Persian Gulf War was associated with self-reports of symptoms of depression, post-traumatic stress disorder, cognitive dysfunction, and alcohol abuse.⁶ Any of these conditions might have contributed to the higher rate of injury among the Gulf War veterans. Further research on the association between combat experience and the subsequent risk of traumatic injury should focus on factors such as these that might offer the possibility of preventive interventions.

The present data analysis has a number of limitations. First, it is based entirely on self-reports and thus open to recall bias and misclassification bias. The three-month

cumulative incidence rate of injuries of 15.5% among the controls was higher than the 5.5% cumulative incidence rate of injuries found among veterans and active duty males ages 25 to 34 years in the 1997 National Health Interview Survey,¹¹ which suggests the possibility of recall bias. Second, of the eligible study subjects, only 76% completed the telephone interview. Third, we had no access to medical records to evaluate the severity of reported injuries and could rely only on the report of medical consultation as a surrogate measure of severity. It is also possible that whether respondents described injuries requiring medical consultation was a function of their access to medical care. Fourth, we had no data on the external causes of the injuries reported and cannot rule out the possibility that Gulf War veterans had an increased risk only for injuries from specific causes. Finally, we did not have data on potential confounders such as military and civilian occupation. Despite these limitations, our results suggest the need for further research concerning the non-fatal injury experience of Gulf War veterans.

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